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AUTHOR Hertz, Vivienne
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ABSTRACT

Cognitive-field psychology is discussed as an alternative to the behavioral model in planning and structuring instructional programs. Applications are discussed in the general area of instruction of adult students in technical writing. Various types of formal and informal approaches to self-assessment at the beginning of such courses are considered, as are means of individualization and self-pacing after the assessments are complete. (AA)

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COGNITIVE-FIELD IMPLICATIONS FOR THE TEACHING OF TECHNICAL WRITING

Vivienne Hertz
School of Technical Careers
Southern Illinois University-Carbondale

Cognitive-field psychology provides teachers who wish to improve their courses through "innovative packaging" an option based on accepted learning theory that differs in philosophy from the popular behavioral model. Cognitive-field balances the extremes between authority and freedom, student- or subject-centered learning. It couples the student's right for some degree of self-direction and the instructor's responsibility for clearing some of the pathways so the learner won't get so entangled in the underbrush that he never reaches his destination.

Implicit in cognitive-field theory are related concepts of goal-setting, reflective thinking, problem raising, and problem solving. A feeling for relationships, often expressed as gaining insight, is a desired learning outcome. This paper will describe directions for self-assessment and goal setting, and loosely suggest methods of integrating self-pacing or other media to individualize by students or by their major fields. The discussion centers on a particular area of instruction, courses in technical writing, and on a particular population, adult students. Such students, usually in non-traditional settings, are assumed to have a greater interest in shared responsibility for course content and exhibit more self-direction, especially for goals they find meaningful.

We teacher-theorists don't pretend to be educational psychologists, since our authority lies in perceptions woven from a tapestry of classroom experiences. As we intellectualize the teaching/learning process, we

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aren't too unlike Kohler's chimp. After working with one stick and enjoying varying degrees of success, we foresee a whole new "ball game" as we find out what can happen with two sticks.

As we chose the team whose colors we'll wear, cognitive-field has a lot to offer. It has the reliability of a long line of respected scholars (Lewin, Tolman, Dewey, Combs, Bruner, Bigge, among others) who wrote and modified the original "rules" and the brashness of the contemporary field psychologists and educational theorists who, by interactive and eclectic integration, are attempting to codify parallels with stimulus-response theory. Arthur M. Cohen theorizes that objectives are a valid structural format for either cognitive-field or S-R. He contends that S-R theory uses instructional objectives as both a stimulus to learning and as a pattern of responses to be exhibited by the learner when he completes the process. Cognitive theory, on the other hand, uses objectives as knowledge of the form of expected responses so that the learner's perceptions, the cues taken from his environment, are shaped by his view of the task ahead of him. (1969, pp. 182-186.) Roueche and Pittman note the need to regard both attitudinal and cognitive elements so that the teacher is viewed as a manager of learning whose primary role is to encourage and facilitate independent study. (1972, pp. 32, 38.)

For those of us who find criterion-referenced measurement too limiting, we contend that we can play in the game (i.e., self-pacing, modular instruction), but the "rules" need to be modified to expand the opportunities. Furthermore, we have backup help to defend our

position. That position essentially is the cognitive-field of the Gestalt-field family, presented by Morris Bigge as helping students restructure their "life spaces" (Lewin's concept of "everything one needs to know about that individual in order to understand his behavior in a specific psychological environment at a specific time," Biehler, 1974, p. 239), or gain new insights into their contemporaneous situations. (1976, pp. 8-9) We use Biehler's definition of cognitive-field as "cognitive emphasizing thought and field theory stressing the conception of a 'field of forces' in behavior, the interaction of factors influencing a person's behavior at a given moment." (1974, pp. 58-59.)

But--in the freedom perhaps permitted an "emergent synthesizer"--there must be an admission of an eclectic elasticity that confesses how influenced by humanism is the added acceptance of elements of Carl Rogers' non-direction. "It is when the individual has to take the responsibility for deciding what criteria are important to him, what goals he has been trying to achieve, and the extent to which he has achieved those goals, that he truly learns to take responsibility for himself and his goals." (1969, pp. 142-143.) That insight is interwoven into the philosophical bent postulating the need for the student to examine his prior learning, his abilities, his values (and perhaps anxieties), and expected learning outcomes as he and the instructor share the responsibility of establishing micro-tasks and structuring major projects within the confines of the course work.

What is technical writing? To clarify the proposed coupling of cognitive-field theory and technical writing, some background on technical writing itself is in order. Technical writing taught at the college or

university level has its origins in engineering departments that saw the writing needs of their graduates as distinct from those of other students throughout the university. By nature, many of the textbooks in the field reflect this emphasis in their prescriptive encouragement of patterned writing, rigorous analytical thinking, and heavy reliance on the sciences or technologies for examples of rhetorical strategies. This scientific influence is still apparent in course content and in institutions that lead in the number and variety of course offerings related to the field. Several of the leading institutions in the United States currently engaged in the training of teachers of technical writing are the College of Engineering at the University of Michigan and the Rensselaer Polytechnic Institute at Troy, New York.

Increasingly these courses have also been offered to students in diverse fields, including electronics, secretarial science, automotives, data processing, commercial graphics, health related fields, forestry, etc. Community colleges are offering courses patterned both on more traditional technical writing and on vocational English. The traditional course is in keeping with the original concept of its being an "upper level" or at least a second or third course in an exposition sequence that would assume some prior knowledge in the student's major field. Vocational English, sometimes called communications for career education, frequently replaces the demands of other composition courses and presents more concrete applications for those students who are assumed to have numerous problems with basic skills. It is not to those students that this paper is directed, although there are diagnostic procedures that, hopefully, would be mutually valued by instructors of many of the cafeteria choices of courses.

The unifying element of technical writing, as opposed to other forms of composition, is the stress on factual information, the importance of the audience to whom reports are addressed, and the definition of technical as peculiar to a particular art, science, trade, or profession. Some sort of problem-solving, or at least problem-analysis, is inherent, frequently in the form of feasibility studies. Research techniques include both traditional library research and field work in the laboratory or elsewhere involving observation, experimentation, and measurement (that might include questionnaires or interviews). Not too clear a distinction is always drawn either in textbooks or in course syllabi to distinguish the needs of those students, the minority, who intend to pursue technical writing as a career and the majority, who are usually preparing for technical or mid-management roles for which clarity in writing style and knowledge of forms are valuable assets.

Course content varies depending upon the number and complexity of courses offered. Typical subject matter includes methods of gathering and organizing data; rhetorical strategies for technical exposition; report components that span mechanical and graphic elements; and specific applications reflected in proposals, physical research, progress reports, feasibility studies, etc. Handbooks and exercises on technical style are incorporated either as part of the text or are available in separate publications.

In practice, it would seem that the technical writer who engages in the art as a profession or the technician who writes a report to be submitted to those above or below him would need to go beyond the scientific limits imposed by a strict interpretation of criterion-referenced

measurement. He faces everyday decisions of what to include and what to exclude. What information seems contradictory to accepted practices (and does that always matter)? Given restrictions of cost and time, what choices seem feasible? Given a change from a technical to a managerial reading audience, what changes are necessary in the presentation? If the technician is going to encounter similar decisions in his work, would not classroom opportunities for self-direction help clarify his perceptions and direct his energies?

In planning such courses, and especially if such planning includes individualization, the instructor is faced with the decision as to which elements lend themselves to self-paced instruction; what problem-solving could be individualized and what could profit from the interaction of the group. A further concern is what constitutes a time expectation from students. Some of these decisions are determined by the instructor's knowledge of the field, but others should be directly influenced by the student as he assesses the areas he wishes to improve or investigate.

Self-assessment. The first learning set or series of activities would inventory each student's skills and interests as he starts the course. The diagnosis would be intended for self-direction and be primarily for the student's own use of the information. Group discussion would center on what relationship the scores might have with investigation and choices of individualized modules. Activities or testing leading to goal setting would include: (1) language usage, (2) critical reasoning, (3) creativity, (4) learning style, (5) value clarification, and (6) an analysis of the current or proposed work setting. How many of these options

are selected would depend upon the length of the course and the portion of time the instructor would be willing to allot to these initial analytical exercises. A workable suggestion is to use three or four beginning class sessions while the students are reading the entire basic text, if one is assigned, outside of class. The reading at that time would be much as they would read a novel--for an overview, but not necessarily for recall.

Testing for language usage might be the diagnostic texting that accompanies whatever individualized learning sets are used. Typical tests take one to one and a half hours to complete and identify areas needing improvement such as sentence patterns, subordination, pronoun reference, punctuation, etc. Possibilities also include the Dailey Business English Test, the Language Perception Test, or others that the instructor would prepare as complements to published programmed texts or the original exercises. The difficulty of the testing would vary with student populations as would the emphasis on basic language skills or on proficiency with technical writing style. A key issue in this testing is that it is non-threatening and intended to give the student directions for self-improvement in skills that will help him with the writing for the course.

Critical reasoning can be tested in several ways: (1) more formally, through the Watson-Glaser Critical Thinking Appraisal or similar widely available tests, or with the diagnostic tests accompanying mini-courses on rhetorical and critical thinking; and (2) informally, by some of the more appealing and appropriate Piagetian tasks. For the purposes of this analysis, it would be inappropriate for the instructor to attempt

to classify students as formal or concrete thinkers. Preferably the tasks would be offered as "brain-teasers" determining who could solve the problem and also analyze how each reached his solution. Competition would be discouraged, but the "AHA" insight encouraged (a cognitive-field application at that). The desired outcome for an analysis of critical reasoning would be the student's awareness of elements of critical judgment and his increasing ability to perceive logical relationships.

Tests for creativity can be informal brainstorming exercises devised by the instructor (such as 35--more or less--ways that a brick, or less practically a blade of grass, can be used), the more formalized published tests, or role playing as part of a pseudo-synectice group. This last suggestion might be delayed until later in the course as the students reconstruct their own thinking processes, and examine some processes consultants are marketing for industry. Two such examples are "idea generation" and "mindspring." Idea generation is a term used by Innotech, a company from Norwich, Connecticut, that says it can invent for anybody on demand. Idea generation is "the ability to come up with lots of ideas that are new to whoever is coming up with them." (Gamache, 1976, p. 730.) Mindspring Theory offered by Synectics, Inc. contends that "managers don't get creative productivity because they unwittingly (using the power of vocals and nonverbals) punish some of the necessary conditions for creative thinking: confusion, uncertainty, and wrongness." (Prince, 1976, p. 293.)

Offered as a digression, or perhaps mindspring, Jerome Bruner's discrimination between analytical and intuitive thinking would give some justification for testing for more than one method of thinking. In

The Process of Education Bruner described each: "Analytic thinking characteristically proceeds one step at a time. Steps are explicit and usually can be adequately reported by the thinker to another individual....In contrast to analytic thinking, intuitive thinking characteristically does not advance in carefully, well-defined steps.... Usually intuitive thinking rests on familiarity with the domain of knowledge involved and with its structure, which makes it possible for the thinker to leap about, skipping steps and employing shortcuts in a manner that requires a later rechecking of conclusions by more analytic means." (1960, pp. 57-58.)

A learning style inventory can be as sophisticated as that devised by Hill and Nunney of Oakland Community College or as brief as that prepared by Kolb, Rubin, and McIntyre in Organizational Psychology: An Experiential Approach (1974, pp. 23-27.) If the inventory is that of Oakland's cognitive style mapping, the testing would more than likely have been completed prior to the first class meeting. It would more probably be a modification, since flexibility is not so possible with limited sections of adult classes. The experiential inventory suggested in Kolb, Rubin, and McIntyre takes about 15 minutes to complete. From a rank ordering of ten sets of words or phrases, the student is able to depict graphically his learning profile as related to preferences for active experimentation, concrete experience, reflective observation, and abstract conceptualization. The graphical plotting of concentric circles represent percentile scores based on combined responses from 127 practicing managers and 512 Harvard and MIT graduate students in management. (1974, p. 25.)

Value clarification can take the form of the unfinished sentence, such as "Whenever I have a report to write, the first thing I do is _____" or rank ordering of statements the student would be likely to make, providing insight into his attitude or anxiety towards writing. Representative statements could be:

"Writing reports is easy for me."

"A large vocabulary impresses others, especially supervisors."

"I never write when I can call on the telephone."

"I feel uncomfortable when I write because I can't remember grammatical rules."

The final mode of self-assessment would be an examination of the work setting the student is now a part of or one he projects for himself. One method of classifying the structure would be by whether he is mainly part of physical activities in which "things" are the focus (assembling, constructing, measuring, etc.), informational processing (creating, analyzing, synthesizing, predicting, etc.). Another popular stratification in technical writing is the identification as an operator, technician, engineer, or executive. This taxonomy is useful not only for self-identification, but also for defining the audience for whom most of his reports are usually written.

All of the assessment processes should lead to the particular end of providing a means by which to examine what the student brings into the course, what he hopes to achieve, and a structure for his initial report (addressed to the instructor and written as a flexible learning contract). This report should describe in detail in what areas he will seek to improve skills and in which directions he plans his investigations--all subject to later modification as his perceptions enlarge and his "life space" expands.

Possibilities for self-pacing. To take full advantage of the assessment procedure, individualization should be the goal for portions of the course. In most cases, the instructor first examines the available commercial materials. Given time, resources, and motivation, he may prepare his own either to supplement one or several texts, or to provide the total course content.

Related to these courses, a growing number of programmed workbooks and mini-courses on language skills are appearing. Also recently available are mini-courses on rhetorical and critical reasoning, as well as programmed texts written for specific fields such as the health sciences. A scarcer commodity are self-instruction workbooks on technical style, although some recently published handbooks could be considered hybrids. Much more could be done with processes and formats, with problems to be analyzed and solved.

The choice of media varies with the course content: the programmed text, slide/tape series with or without worksheets, videotapes, films, taped conferences to and from students to evaluate writing. The list can go from the known to the realm of "idea generation." We have only scratched the surface with the computer-assisted instruction (CAI) and computer-managed instruction (CMI). The possibilities of branching allow an extensive range in problem solving simulations. Student fascination with games simulation was apparent locally as SIU had to place time restrictions on students' "game time" at the PLATO terminals.

The chosen flight plan, from a host of others, is cognitive-field; the chosen parachute is shared responsibility with the student. He can move from cloud to cloud, but with our (his and mine) increasing perceptions the soaring may reach the heights of the catskill eagle.

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